CLAIMS

It is claimed:

1. A pair of semiconductor devices configured for a push-pull operation, comprising:

a first device, comprising:

a first n-doped region;

a first p-doped region;

a p-doped channel situated between said first n-doped and first p-doped regions, wherein a first depletion region exists within said channel when a reverse bias voltage is applied across said first n-doped and first p-doped regions; and

a first photosensitive region comprising a relatively high p-doped region situated within said p-doped channel and partially including said first depletion region when said reverse bias voltage is applied across said first n-doped and first p-doped regions, wherein hole-electron pairs are generated from said partial first depletion region within said first photosensitive region in response to an incident light upon said first photosensitive region;

a second device, comprising:

a second p-doped region;

a second n-doped region;

an n-doped channel situated between said second n-doped and second p-doped regions, wherein a second depletion region exists within said n-doped channel when a reverse bias voltage is applied across said second n-doped and second p-doped regions; and

a second photosensitive region comprising a relatively high n-doped region situated within said n-doped channel and partially including said second depletion region when said reverse bias voltage is applied across said second n-doped and second p-doped regions, wherein hole-electron pairs are generated from said partial second depletion region within said second photosensitive region in response to said incident light upon said second photosensitive region;

a first impedance load connected to said first n-doped region for receiving a first bias voltage;

a second impedance load connected to said second p-doped region for receiving a third bias voltage; and

wherein said first p-doped region and said second n-doped region are coupled together to a third bias voltage, and wherein said first bias voltage is more positive than said third bias voltage, and further wherein said third bias voltage is more positive than said second positive voltage.

2. The pair of semiconductor devices of claim 1, wherein said third bias voltage is at ground potential.

3. The pair of semiconductor devices of claim 1, further including a fiber optic channel for applying an optical signal to said first and second photosensitive regions.

4. A pair of semiconductor devices configured for a push-pull operation, comprising:

a first device, comprising:

a first n-doped region;

a first p-doped region;

a p-doped channel situated between said first n-doped and first p-doped regions, wherein a first depletion region exists within said channel when a reverse bias voltage is applied across said first n-doped and first p-doped regions; and

a first photosensitive region comprising a relatively high p-doped region situated within said p-doped channel and partially including said first depletion region when said reverse bias voltage is applied across said first n-doped and first p-doped regions, wherein hole-electron pairs are generated from said partial first depletion region within said first photosensitive region in response to an incident light upon said first photosensitive region;

a second device, comprising:

a second p-doped region;

a second n-doped region;

an n-doped channel situated between said second n-doped and second p-doped regions, wherein a second depletion region exists within said n-doped channel when a reverse bias voltage is applied across said second n-doped and second p-doped regions; and

a second photosensitive region comprising a relatively high n-doped region situated within said n-doped channel and partially including said second depletion region when said reverse bias voltage is applied across said second n-doped and second p-doped regions, wherein hole-electron pairs are generated from said partial second depletion region within said second photosensitive region in response to said incident light upon said second photosensitive region;

a first impedance load connected to said first n-doped region at a first end thereof and to said second n-doped region at a second end thereof, wherein a first bias voltage is to be applied to said second end of said first impedance load; and

a second impedance load connected to said first p-doped region at a first end thereof and to said second p-doped region at said second end thereof, wherein a second bias voltage is to be applied to said second end of said second impedance load, wherein said first bias voltage is more positive than said second bias voltage.

5. The pair of semiconductor devices of claim 4, wherein said second bias voltage is at ground potential.

6. The pair of semiconductor devices of claim 4, further including a fiber optic channel for applying an optical signal to said first and second photosensitive regions.

7. A semiconductor device configured for a push-pull operation, comprising:

a p-doped region;

an n-doped region;

an n-doped channel situated between said second n-doped and second p-doped regions, wherein a second depletion region exists within said n-doped channel when a reverse bias voltage is applied across said second n-doped and second p-doped regions; and

a second photosensitive region comprising a relatively high n-doped region situated within said n-doped channel and partially including said second

depletion region when said reverse bias voltage is applied across said second n-doped and second p-doped regions, wherein hole-electron pairs are generated from said partial second depletion region within said second photosensitive region in response to said incident light upon said second photosensitive region;

a first load impedance having a first end coupled to said n-doped region, and a second end for receiving a first bias voltage;

a second load impedance having a first end coupled to said p-doped region, and a second end for receiving a second bias voltage, wherein said first bias voltage is more positive than said second bias voltage.

8. The semiconductor device of claim 7, wherein said second bias voltage is at ground potential.

9. The semiconductor device of claim 7, further including a fiber optic channel for applying an optical signal to said first photosensitive region.

10. A semiconductor device configured for a push-pull operation, comprising:

an n-doped region;

a p-doped region;

a p-doped channel situated between said first n-doped and first p-doped regions, wherein a first depletion region exists within said channel when a reverse bias voltage is applied across said first n-doped and first p-doped regions; and

a first photosensitive region comprising a relatively high p-doped region situated within said p-doped channel and partially including said first depletion region

when said reverse bias voltage is applied across said first n-doped and first p-doped regions, wherein hole-electron pairs are generated from said partial first depletion region within said first photosensitive region in response to an incident light upon said first photosensitive region;

a first load impedance having a first end coupled to said n-doped region, and a second end for receiving a first bias voltage;

a second load impedance having a first end coupled to said p-doped region, and a second end for receiving a second bias voltage, wherein said first bias voltage is more positive than said second bias voltage.

11. The semiconductor device of claim 10, wherein said second bias voltage is at ground potential.

12. The semiconductor device of claim 10, further including a fiber optic channel for applying an optical signal to said first photosensitive region.